



Printed Pages : 7

EAS102

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 9603

Roll No.

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**B.Tech**

**(SEM I) ODD SEMESTER THEORY EXAMINATION 2009-10**

**ENGG.CHEMISTRY -I**

*Time : 3 Hours*

*[Total Marks : 100]*

### SECTION-A

1 Choose/Fill correct answer : 20×1=20

(i) Which of the following has a bond order of 2.5?

(a) CO

(b) NO

(c)  $\text{He}^{2+}$

(d)  $\text{O}_2^-$

(ii) Hydrogen bonding is maximum in

(a) Ethyl chloride

(b) Ethanol

(c) Diethyl ether

(d) Triethyl amine

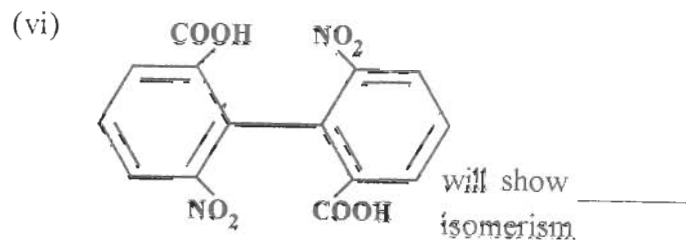


- (iii) A zero order reaction is one
- (a) in which rate is independent of reactants concentration.
  - (b) in which one of the reactants is in large excess.
  - (c) whose rate is not affected by time
  - (d) whose rate increases with time.
- (iv) Rusting of iron is
- (a) Enhanced by dry air.
  - (b) Prevented by cleaning
  - (c) Retarded in the presence of dissolved salts.
  - (d) Prevented if the article is connected with a piece of Mg.
- (v) The most stable carbanion is
- (a) methyl carbanion
  - (b) primary carbanion
  - (c) secondary carbanion
  - (d) tertiary carbanion.
- (vi) Chiral molecules are those which are
- (a) not superimpossible on their mirror image
  - (b) are superimpossible on their mirror image
  - (c) show geometrical isomerism
  - (d) unstable molecules.

- (vii) Bakelite is
- (a) gel
  - (b) solid
  - (c) liquid
  - (d) gas
- (viii) The vulcanized rubber contains
- (a) sulphur
  - (b) iron
  - (c) beryllium
  - (d) zinc
- (ix) Presence of functional group in a compound can be established by using
- (a) Chromatography
  - (b) Mass spectroscopy
  - (c) IR spectroscopy
  - (d) X-rays diffraction.
- (x) Which indicator have pH range of 8.3-10
- (a) Phenolphthalein
  - (b) methyl red
  - (c) methyl orange
  - (d) none of these

(xi) Fill in the blanks :

- (i) Hydrogen bond is a \_\_\_\_\_ than a covalent bond.
- (ii) Graphite is an \_\_\_\_\_ of carbon.
- (iii) An atom at the corner of a cubic unit cell makes \_\_\_\_\_ contribution to particular unit cell.
- (iv) The degree of freedom of a triple point is \_\_\_\_\_.
- (v) \_\_\_\_\_ is electrochemical disintegration of a metal.



- (vii) In cannizzaro reaction aldehyde must consist of \_\_\_\_\_.
- (viii) The monomer of natural rubber is \_\_\_\_\_.
- (ix) The main component of biogas is \_\_\_\_\_.
- (x) Hardness of water is expressed in terms of equivalent of \_\_\_\_\_.

## SECTION-B

2 Attempt any **three** of the following : **10×3=30**

- (i) (a) What is metallic bond? Explain it on the basis of bond theory.
- (b) A unit cell of sodium chloride has four formula units. The edge length of unit cell is 0.564. What is the density of sodium chloride?
- (ii) State and explain phase rule. Discuss the salient features of phase diagram of water system.
- (iii) (a) Describe the conformational isomers of n-butane.
- (b) Write the mechanism of the following reactions :
  - (i) Aldol condensation
  - (ii) Beckmann rearrangement
- (iv) (a) Describe preparation, properties and application of
  - (i) Buna-S
  - (ii) Nylon 6,6.
- (b) Discuss general methods for the preparation of organometallic compounds. What are applications of organometallic compound of Mg.
- (v) (a) What is importance of IR spectroscopy in finger print region?

- (b) 0.72 gm of a fuel containing 80% carbon, when burnt in a bomb calorimeter, increased the temperature of water from 27.3°C to 29.1°C. If the calorimeter contains 250 grams of water and its water equivalent is 150 gram calculate the HCV of fuel. Give answer in kJ/kg.

### SECTION-C

10×5=50

3 Attempt any **one** part of the following :

- (a) Discuss the classification of liquid crystals and write down its applications.
- (b) Describe the preparation, structure and applications of fullerenes.

4 Attempt any **one** part of the following :

- (a) Describe the construction of galvanic cell. Write down the electrode reactions and formula of its e.m.f.
- (b) In a second order reaction, where the initial concentration of the reactants is the same, half of the reactants are consumed in 60 minutes. If the specific reaction rate is  $5.2 \times 10^{-3} \text{ mol}^{-1} \text{ L minute}^{-1}$ . What is the initial concentration of the reactant.

5 Attempt any **one** part of the following :

- (a) What are carbocations? Show hybridization in carbocations and discuss stability of primary, secondary and tertiary carbocations.
- (b) Discuss stereochemistry of tartaric acid. What will happen if one of the OH groups of tartaric acid is replaced by  $\text{NH}_2$  group ?

6 Attempt any **one** part of the following :

- (a) Write short note on conducting polymers.
- (b) What are differences between
- (i) Thermosetting and thermoplastic polymers
- (ii) Homopolymers and copolymers.

7 Attempt any **one** part of the following:

- (a) Describe proximate and ultimate analysis of fuels.
- (b) What is hardness of water? Describe zeolite process for making soft water from hard water.